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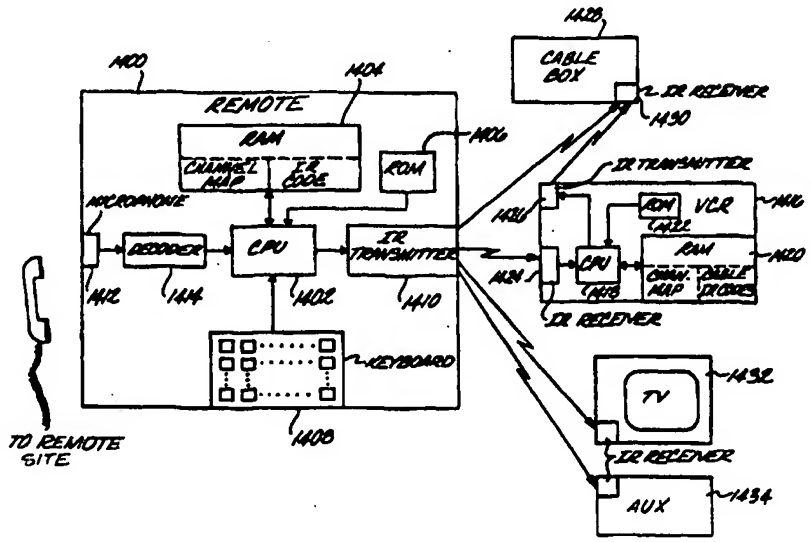

(57) Abstract

A telephone set includes a decoder (1414) for decoding compressed codes of as few as 1 to 8 digits, which are compressed in length from the combination of channel, time-of-day and length information. A clock for providing an output as a function of time is integral to the telephone set and the telephone set includes a means for transmitting commands to an appliance, such as a recorder (1416). The telephone set commands the recorder to turn on in response to comparison of the decoded time-of-day commands with the clock output and commands the selection of a channel of the information broadcast to record to turn off in response to comparison of the record on time with the decoded length commands. In one embodiment the telephone set includes a cordless telephone. Methods are provided for downloading initial setup data from a remote site and for remotely entering compressed codes via telephone.

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TELEPHONE APPARATUS AND METHODS USING COMPRESSED CODES

Background of the Invention

Field of the Invention:

This invention relates generally to video cassette recorder systems and telephone sets and particularly to apparatus and methods for using encoded information with a telephone set to shorten the time required to perform timer preprogramming and for remotely controlling various appliances, such as a video cassette recorder, and for easily performing an initial setup routine of such an apparatus.

Description of the Related Art:

The video cassette recorder (VCR) has a number of uses, including playing back of tapes filmed by a video camera, playing back of pre-recorded tapes, and recording and playing back of broadcast and cable television programs.

To record a television program in advance of viewing it, a two-step process is often used: (1) obtain the correct channel, date, time and length (CDTL) information from a television program guide, and (2) program this CDTL information into the VCR. Depending on the model, year and type of the VCR, the CDTL information can be programmed in various ways including: (i) pushing an appropriate sequence of keys in the console according to instructions contained in the user's manual, (ii) pushing an appropriate sequence of keys in a remote hand-held control unit according to instructions contained in the user's manual (remote programming), and (iii) executing a series of keystrokes in the remote hand-held control unit in response to a menu displayed on the television screen (on-screen programming). Other techniques for timer preprogramming have been suggested including: (iv) reading in certain bar-code information using a light pen (light pen programming), and (v) entering instructions through a computer or telephone modem. These various methods differ only in the physical means of specifying the information while the contents, being CDTL and certain power/clock/timer on-off commands are generally common although the detailed protocol can vary with different model VCRs. Methods (i) and (ii) described above can require up to 100 keystrokes, which has inhibited the free use of the timer preprogramming feature of VCRs. To alleviate this, new VCR models have included an "On-Screen Programming" feature, which permits remote input of CDTL information in response to a menu displayed on the television screen. Generally on screen programming of CDTL information requires an average of about 18 keystrokes, which is less than some of the prior methods but still rather substantial. Some of the other techniques such as (iv) above, require the use of special equipment such as a bar code reader.

In general the present state of the art suffers from a number of drawbacks. First, the procedure for setting the VCR to record in advance can be quite complex and confusing and difficult to learn; in fact, because of this many VCR owners shun using the timer preprogramming record feature. Second, the transcription of the CDTL information to the VCR is hardly ever error-free; in fact, many users of VCR's timer preprogramming features express concern over the high incidence of programming errors. Third, even for experienced users, the process of entering a lengthy sequence of information on the channel, date, time and length of desired program can become tedious. Fourth, techniques such as reading in bar-code information or using a computer require special equipment. These drawbacks have created a serious impediment in the use of a VCR as a recording device for television programs. The effect is that time shifting of programs has not become as popular as it once was thought it would be. Accordingly, there is a need in the art for a simpler system for effecting VCR timer preprogramming which will enable a user to take advantage of the recording feature of a VCR more fully and freely.

Summary of the Invention

A principal feature of the invention is providing an improved system for the selection and entering of channel, date, time and length (CDTL) information required for timer preprogramming of a VCR which is substantially simpler, faster and less error-prone than present techniques. Another principal feature of the invention is providing televisions having an embedded capability for timer programming control.

In accordance with the invention, to program the timer preprogramming feature of a video system, there is an apparatus and method for using encoded video recorder/player timer preprogramming information. The purpose is to significantly reduce the number of keystrokes required to set up the timer preprogramming feature on a VCR. In accordance with this invention it is only necessary for the user to enter a code with 1 to 8 digits or more into the VCR. This can be done either remotely or locally at the VCR. Built into either the remote controller or the VCR is a decoding means which automatically converts the code into the proper CDTL programming information and activates the VCR to record a given television program with the corresponding channel, date, time and length. Generally multiple codes can be entered at one time for multiple program selections. The code can be printed in a television program guide in advance and selected for use with a VCR or remote controller with the decoding means.

A product embodying these features is now commercially available and has enjoyed great commercial success. This instant programmer, sold under the VCRPlus+® trademark, consists of a handheld unit into which compressed codes (each 1 to 8 digits long) for television programs to be recorded are entered. The compressed codes are most commonly found in printed television listings. The instant programmer decodes the compressed codes into channel, date, time-of-day and length commands which are then stored in the

programmer's memory. When date and time of the program in the memory that is scheduled the nearest to the current time coincides with the current time, as determined by an internal clock, the instant programmer, using an infrared transmitter and universal remote technology, sends infrared remote control signals to a cable box or a video recorder to change the channel to the correct channel and infrared remote control signals to a video recorder to turn the recorder on and begin recording. After the length for the program, stored in memory, has elapsed, an infrared remote control signal to stop recording is sent to the video recorder.

Before the VCRPlus+ programmer can be used, the user must perform an initial setup procedure. This procedure includes entering the brands and models of the user's video recorder and cable box into the programmer, setting the clock in the programmer, and entering a local channel map which maps "national" channel numbers for certain networks and cable channels into the actual channel numbers used for these channels by the user's cable system. The instant programmer is manufactured with the infrared codes necessary to remotely control a wide variety of cable boxes and video recorders stored in ROM. The model and brands of the cable box and video recorder must be entered so that the instant programmer will use the correct ones of the infrared codes stored in ROM for the user's particular video recorder and cable box

A parent application to the present application includes an improvement to the video recorder with a built in instant programmer and remote control transmitter that involves downloading data over telephone lines from a remote site to the video recorder. In several embodiments the information downloaded is initial setup data that otherwise would have to be manually keyed in by the user. Instead, the user can call a customer service representative on the telephone and orally give the representative the information necessary to perform the initial setup. The representative then enters the necessary information into a computer which, in turn, downloads the data over the telephone line to the video recorder which has been connected to the telephone line. In various embodiments, the video recorder is connected to the telephone line by a modular phone jack in the video recorder or through the telephone's earpiece which is held in the proximity of a microphone connected to the video recorder. In other embodiments, data is downloaded first over a telephone line into a VCR remote controller, instead of into the video recorder directly, in any of the ways that the data can be transmitted to the video recorder. Thereafter, the data is retransmitted from the VCR remote control to the video recorder through infrared remote control signals transmitted by the VCR remote and received by the video recorder.

In any of these embodiments, the initial setup data is transferred and stored into the video recorder or remote controller without the user having to key the information manually.

A principal object of the present invention is to embed the decoding means into a telephone set. The telephone set at the appropriate times, distributes the proper commands to appliances including a VCR, cable box, television, and/or satellite receiver to record

selected programs. Controls on the telephone set are used to enter codes that signify the program to be recorded and are compressed in length from the individual commands for channel, date, time-of-day and length. The normal touch-tone keypad of a telephone set can be used to enter the numbers of the code. Other controls are provided on the telephone set to perform normal television control functions, such as channel selection and volume control. When the codes are entered into the telephone set, the codes are decoded into CDTL information. Then, at the appropriate time, the telephone set transmits the proper commands to a VCR, cable box television and/or satellite receiver to command the recording of the selected program. This control function is carried out by using an infrared link from the telephone set to the VCR, television, cable box and satellite receiver.

Another principal object of the present invention is to provide a telephone set comprising a telephone base unit and a cordless telephone, which can be inserted into the telephone base unit to charge the batteries in the cordless telephone. An RF link is provided between the cordless telephone and the telephone base unit. The RF link can also be used to control various appliances. Controls on the telephone base unit or the cordless telephone are used to enter compressed codes for CDTL information and to review or cancel codes already entered. The entered codes can be transmitted from the cordless telephone to the telephone base unit via the RF link between the cordless telephone and the telephone base unit. The telephone base unit or the cordless telephone decodes the codes into CDTL, which can be transmitted between the cordless telephone and the telephone base unit. For example, the telephone base unit can retransmit the CDTL information back to the cordless telephone for review by a user at a remote distance from the telephone base unit.

The telephone base unit is located near the VCR and cable box and any other audio and/or video equipment to be controlled, such as a satellite receiver or a television. The telephone base unit can be connected directly to wall power and to a telephone line or alternatively the telephone base unit could be a cellular phone with batteries and a cellular RF antenna. The telephone base unit contains IR transmitters capable of transmitting in multiple directions such as front, back, left, right, and up, which helps to insure that an infrared link will be established between the telephone base unit and the VCR, cable box, satellite receiver and/or television to be controlled.

Another objective of the present invention is to provide a method for downloading initial setup data from a remote site to the telephone set containing the decoder for compressed codes. The user calls a representative at a remote site and describes his equipment, and then the representative enters that into a computer and the computer downloads the initial setup data directly over the telephone network to the telephone set containing the decoder and the initial setup data is stored within the telephone set.

Another objective is to allow a user to enter the compressed codes for selected programs from a remote site directly into the telephone set. The telephone set contains logic

to allow it to answer the telephone after a predetermined set of rings. The telephone set also contains a voice generation capability that is used to ask the caller to enter a password. If a correct password is entered, then the voice generation is used to ask the user to enter a compressed code for a selected program. The telephone base unit then stores the compressed code and then decodes the compressed code to CDTL to control the recording of the selected programs.

Yet another objective of the present invention is to provide a telephone set that is able to automatically command an audio apparatus to lower the volume when the telephone is answered. The telephone set can send the commands via the infrared transmitters built into the telephone set. The volume of the audio apparatus can be lowered to a predetermined volume or the audio apparatus could be commanded to mute the audio. When the telephone set determines that a call has been terminated in the telephone base unit, then the telephone set can send a command to raise the volume of the audio apparatus. The audio apparatus to be controlled can include video cassette recorders, television sets, radios, and stereo equipment.

Another objective of the present invention is to provide apparatus and methods for accessing a telephone number embedded in a television program and dialing the telephone number. In one embodiment, program related information is embedded in the vertical blanking interval (VBI) line of a television signal and displayed on a television monitor. The program related information is transmitted from the television set or a video cassette recorder having a VBI decoder to the telephone set. The program related information could be a telephone number to be used to obtain more information for an item that is being advertised or for ordering the item being advertised. Once the telephone number is stored in the telephone set, then the user can operate the telephone set to recall the telephone number from storage and display the telephone number again on either a television monitor or on a display on the telephone set. Then, if the user chooses, the user can push a button on the telephone set to automatically dial the number.

Other objects and many of the attendant features of this invention will be more readily appreciated as the same becomes better understood by reference to the following detailed descriptions and considered in connection with the accompanying drawings in which like reference symbols designate like parts throughout the figures.

Brief Description of the Drawings

FIG. 1 is a perspective view of an apparatus for using compressed codes for recorder preprogramming according to a preferred embodiment of the invention;

FIG. 2 is a bottom view of the apparatus of FIG. 1 showing a microphone hole and two electrical contact holes;

FIG. 3 shows the apparatus of FIG. 1 being used in conjunction with a telephone;

FIG. 4 is a schematic showing an apparatus for using compressed codes for recorder preprogramming according to a preferred embodiment of the invention;

FIG. 5 is an alternate schematic showing second apparatus for using compressed codes for recorder preprogramming according to a preferred embodiment of the invention;

FIG. 6 is a block diagram of a system for downloading initial setup data from a remote site, through a remote control, to a video recorder capable of controlling other devices, according to a preferred embodiment;

FIG. 7 is a flow diagram of a method for downloading initial setup data from a remote site, through a remote control, to a video recorder, according to a preferred embodiment;

FIG. 8 is a block diagram for an alternative embodiment of the system shown in FIG. 6;

FIG. 9 is a block diagram for an alternative embodiment of the system shown in FIG. 6;

FIG. 10 is a block diagram for an alternative embodiment of the system shown in FIG. 6;

FIG. 11 is a diagram of a system for downloading television program data to a telephone downloadable programmer for control of video recorders and channel selectors;

FIG. 12 is a flow diagram showing the operation of the system shown in FIG. 11;

FIG. 13 is a perspective view of a telephone set having a decoder for decoding compressed codes for recorder programming and showing a cordless telephone mounted in a telephone base unit according to an embodiment of the invention;

FIG. 14 is a perspective view of the telephone base unit of FIG. 13 with the cordless telephone removed and showing built-in infrared transmitters according to an embodiment of the invention;

FIG. 15 is a perspective view of the cordless telephone of FIG. 13 showing batteries and an infrared transmitter in the cordless telephone according to an embodiment of the invention;

FIG. 16 is a bottom or base view of the apparatus shown in FIG. 15 according to an embodiment of the invention;

FIG. 17 is a perspective view showing a manner of placing the telephone base unit of FIG. 14 relative to a video cassette recorder, cable box and television sets according to an embodiment of the invention.

FIG. 18 is a schematic of a cordless telephone having an embedded code decoder means according to an embodiment of the invention;

FIG. 19 is a schematic of a telephone set having an embedded code decoder means. The telephone set of FIG. 19 can be a telephone base unit as shown in FIG. 17 or a conventional telephone set according to an embodiment of the invention;

FIG. 20 is block diagram of a system for controlling a VCR, cable box, satellite receiver, and television from a telephone set comprising a telephone base unit and a cordless telephone according to an embodiment of the invention;

FIG. 21 is a flow diagram of a method for downloading initial setup data from a remote site to a telephone set according to an embodiment of the invention;

FIG. 22 is a flow diagram of a method for downloading selected television program codes to a telephone set for control of the recorder programming according to an embodiment of the invention;

FIG. 23 is a flow diagram of a method for allowing a user to remotely enter a compressed code for recorder programming according to an embodiment of the invention;

FIG. 24 is a flow diagram showing a method for a telephone set to control the volume of audio apparatus when the telephone set is answered according to an embodiment of the invention;

FIG. 25 is a schematic showing a television raster scan and showing the vertical blanking interval lines during the retrace from the bottom of the screen to the top of the screen;

FIG. 26 is a diagram showing the vertical blanking interval lines and showing that a vertical blanking interval line may contain information including: channel specific program guide (CSPG), which is a television program guide specific to a particular channel; program related information (PRI), which can also be referred to as instant info (IINFO), both of which can provide information such as a telephone number or a sports score related to a broadcast; a video magazine (V(m)) packet, which can contain may types of information; a TPA packet, containing a tape identification, a program number, and an absolute address; and a directory, which contains a listing of programs recorded on a tape or being broadcast for recording.

FIG. 27 is a block diagram of a VCR including a vertical blanking interval line decoder, a character generator, a memory for containing a directory of programs stored on a tape, a microcomputer for allowing programs to be accessed on a tape, an infrared receiver, and an infrared transmitter according to an embodiment of the invention;

FIG. 28 is a diagram showing a portion of a tape with TPA packets and a directory written in the vertical blanking interval lines according to an embodiment of the invention;

FIG. 29A is a diagram showing the format of a TPA packet comprising a tape identification field, a program number field and a absolute address field according to an embodiment of the invention;

FIG. 29B is a diagram showing the format of a directory written in vertical blanking interval lines comprising a program title, a program number, a start address, an end address, the record speed, and additional fields for other information such as a program description according to an embodiment of the invention;

FIG. 30 is block diagram showing a telephone base unit and a cordless telephone that can control a VCR, a cable box, a satellite receiver and a television and also showing a VCR that can transmit information accessed from the vertical blanking interval lines of a television signal to the telephone base unit and/or cordless telephone according to an embodiment of the present invention;

FIG. 31 is a block diagram showing a telephone base unit in series between a VCR and a television set, the telephone base unit and the cordless telephone having the capability of controlling a VCR, cable box, satellite receiver, and television set according to an embodiment of the invention; and

FIG. 32 is a flow diagram of a method for accessing a telephone number from a television signal and dialing the number according to an embodiment of the present invention.

Detailed Description

Referring now to the drawings, and more particularly, to FIGS. 1 and 2, there is shown custom programmer 1100 for using compressed codes for a recorder programming. The custom programmer 1100 has number keys 1102, which are numbered 0-9, a CANCEL key 1104, a REVIEW key 1106, a WEEKLY key 1108, a ONCE key 1110 and a DAILY (M-F) key 1112, which are used to program the custom programmer 1100. A lid normally covers other keys, which are used to setup the instant custom programmer 1100. When lid 1114 is lifted, the following keys are revealed, but not shown in the drawings: SAVE key, ENTER key, CLOCK key, CH key, ADD TIME key, VCR key, CABLE key, and TEST key. Also included in the custom programmer 1100 shown in FIG. 1 are: liquid crystal display 1134, red warning light emitting diode 1132 and IR diodes 1134.

The custom programmer operates essentially the same as the instant programmer of U.S. patent 5,335,079, which is incorporated herein by this reference as though set forth in full.

When using the instant programmer described in U.S. Patent 5,335,079, the consumer initially performs a set-up sequence, consisting of selecting a protocol for the model/brand of VCR, setting the current real time, selecting a protocol for the model/brand of cable box, and entering a series of channel number assignments. Although the instant programmer makes recording of television programs extremely simple, the initial set-up sequence for the instant programmer is more complex and deters the use of the instant programmer by some consumers. Custom programmer 1100 includes a microphone opening 1140 through which at least one microphone inside the custom programmer 1100 can receive electronically coded audio signals that contain the information necessary for the custom programmer's initial set-up and commands to store this information into the custom programmer 1100.

In order to receive these audio signals, a user may call a special phone number which could be a toll-free 800 number, a pay-per-minute 900 number, or a standard telephone number with standard toll charges applying. The consumer can speak to an operator who

orally inquires from the consumer the information regarding the consumer's VCR model and brand, zip code, cable company, model and brand of cable box and the newspaper or other publication which the consumer will use to obtain the compressed codes. This is all the information needed to perform the initial set-up for the custom programmer 1100. From the zip code cable company information, the operator can determine the cable channel line-up for the consumer and combine this data with the knowledge of which publication the consumer will use to select the correct local channel mapping table for the consumer.

The operator then directs the consumer to press a designated programming key which is, in the case of the preferred embodiment, the CH key located under lid 1114. When the CH key is pressed, the display 1134 with display the message "PHONE1 KEY2". Pressing the "2" numeric key places the custom programmer into the manual local channel table programming mode that is implemented by instant programmer when CH key 322 is pressed. Pressing the "1" numeric key initiates the remote programming mode. The custom programmer 1100 is then ready to receive an audio signal and display 1134 displays the message "WAIT".

The operator will then direct the consumer to place the earpiece 1142 of the telephone receiver 1144 over the microphone opening 1140 of the custom programmer 1100 as generally shown in FIG. 3. The earpiece need not be placed directly against the custom programmer 1100, but may be held more than an inch away from the microphone opening with generally satisfactory results. After a pause sufficient to allow the consumer to place the telephone receiver in the proper position, the operator will initiate the downloading of the initial set-up data and initial set-up programming commands transmitted over the telephone line 1146 using audio signals to the consumer's custom programmer 1100.

If the initial set-up data is successfully transferred to the custom programmer 1100, the display 1134 of the custom programmer 1100 will display the message "DONE". If the reception of the initial set-up data is not successful within a predetermined time limit, red warning light emitting diode 1132 will blink to inform the consumer to adjust the position of the telephone earpiece before another down load of the information is attempted. After a waiting period allowing this adjustment, the initial set-up data and commands are re-transmitted over the telephone line. If after a predetermined number of attempts to download the initial set-up information are unsuccessful, the liquid crystal display 1134 displays the message "FAIL" and the operator is again connected to the consumer allowing the operator to speak to the consumer to provide additional assistance in the positioning of the telephone earpiece.

Alternatively, a live operator can be provided by the local cable company and the initial set-up information downloaded to the custom programmer 1100 by telephone line, through the existing cable of the cable system, or any other transmission means. If local cable companies supply the live operators, the only information they would need to gather

from the consumer would be the VCR brand and model and the publication containing compressed codes that the consumer plans on using, because the local cable company would know the model and brand of cable box installed at the consumer's location and the necessary data regarding the local channel designations for that cable system.

FIGS. 4 and 5 are schematics of the circuitry needed to implement alternative embodiments of the custom programmer 1100. The circuit consists of microcomputer 1150, oscillator 1152, liquid crystal display 1154, keypad 1156, compressed code decoder 1153, five way IR transmitters 1158 and red warning light emitting diode 1160. The functions of these components are described in U.S. Patent 5,335,079. In particular, the compressed code decoder 1153 is a decoder for compressed codes each having at least one digit representative of, and compressed in length from, a channel, time-of-day, and length for a program. U.S. Patent No. 5,335,079 describes the use of the compressed codes for recorder programming.

In both FIGS. 4 and 5, earpiece 1142 generates serial audio signals which are received by microphone 1162. As shown in FIG. 4 the audio signals received by microphone 1162 are passed through amplifier 1164 and forwarded through a decoder circuit 1165 which can be a DTMF decoder, and into a serial port of microcomputer 1150. In the alternative circuit shown in FIG. 5, the audio signals received by microphone 1162 are passed through amplifier 1165, through a band pass filter 1168 with a cutoff at approximately 1 - 4 kHz, and through a second amplifier 1170 to a serial port of microcomputer 1150.

Alternatively, a dual microphone system (not shown) may be employed to increase reliability, especially when the custom programmer 1100 is to be programmed in an environment with a high level of background noise that could interfere with the transmission of data through the single microphone acoustic means. In this system, one microphone is placed near the telephone earpiece and the second microphone is placed some distance away from the earpiece in order to pick up background noise. An audio signal cancellation circuit is then used to effectively "subtract" the background noise picked up by the second microphone from the audio data signals combined with the background noise that is picked up from the first microphone resulting in solely clean audio data signals.

In an alternate embodiment, a VCR remote 1400 is also a universal remote as well as having all the functions of custom programmer 1100. Thus, the VCR remote is capable of controlling the cable box 1428, VCR 1416, television 1432 and any other auxiliary home electronic equipment 1434 that is IR remote controllable.

A significant advantage of the VCR remote controller 1400 is that the data required to be entered into the VCR 1416 for the initial setup can initially be downloaded from a remote site by telephone to the VCR remote controller in the same manner as for custom programmer 1100. To do this, the consumer calls the remote site by using the telephone, and orally gives the information necessary to perform the initial setup to a person at the

remote site. The person at the remote site then instructs the consumer to place the telephone earpiece near the microphone of the VCR remote and the initial setup is downloaded. Thereafter, the user easily causes the data to be downloaded by IR transmission from the VCR remote control to the VCR itself by pressing a "send" key or a "send" sequence of keys. The VCR receives the initial setup data, stores it in its memory 1420 and then is ready to be used as an instant programmer.

In an alternative embodiment, shown in FIG. 8 the structural elements of the custom programmer 1100 shown in FIGS. 1-5, including a microphone 1450 and decoding assembly 1452, are embedded within a VCR 1454. In this embodiment, the user holds the telephone earpiece 1456 to the microphone embedded in the VCR to download the initial setup data directly from the remote site into the VCR. The difficulty with this embodiment is that often a user's VCR and telephone are not located close enough together to position the telephone earpiece near the VCR. Further, correction of this problem, which would involve adding an extension cord to the telephone or disconnecting and relocating the VCR nearer the telephone are not convenient.

In another embodiment, shown in FIG. 9, the microphone in the VCR with custom programmer embedded is replaced with a modular phone jack 1458 that leads directly to the decoder assembly 1452 in the VCR. A standard telephone line 1460 would then connect the VCR to a modular T-connector 1462 so that both the VCR and an independent telephone 1464 are connected to the telephone line 1466. The consumer then uses the telephone to call and talk to the remote site, but the data is transmitted directly to the VCR. The transfer of data by this method may be more accurate than transmission by audible tones. However, this embodiment suffers from the same problem of the proximity of the consumer's phone outlets to the VCR.

With the embodiment shown in FIG. 6, though, the proximity of the VCR to a consumer's telephone or telephone jack is not important. The consumer simply carries the remote to his or her phone and gets the initial setup data downloaded into the VCR remote. The consumer then carries the remote to a location near the VCR and downloads the initial setup data to the VCR.

In another embodiment, the VCR remote, shown in FIG. 6, operates as a relay station, translating the audio signals from the telephone directly into IR pulses beamed at an appliance, such as a VCR or a TV.

Another embodiment, shown in FIG. 10, is to install a modular jack 1466 into the VCR remote 1400. In this embodiment, the VCR remote is connected to the telephone by a T-connector 1468 and operates in the same way as the VCR with a built in modular jack described above and shown in FIG. 9 except that after the initial setup data is transferred to the VCR remote, the VCR remote is placed near the VCR and the initial setup data is downloaded by IR transmission to the VCR . One advantage that this embodiment has over

the VCR with a built in modular jack is that the VCR remote can be taken to the telephone whereas the VCR may be located far from the telephone. It is also possible to add a DTMF generator to the VCR remote so that the keypad 1408 of the VCR remote can be used to dial the telephone number of the remote site. Alternatively, telephone numbers for the remote site are stored in the memory of the VCR remote so that the consumer may dial the remote site by pressing a minimum number of keys.

The details of the operation of the VCR remote and similarly the custom controller 1100 are as follows. In the first step, shown in block 1440 of FIG. 7, the consumer places a telephone call on either an 800, 900 or normal toll call line to a customer service representative. In block 1442, the representative inquires from the consumer information necessary to perform the initial setup, such as the consumer's ZIP code or the name of the consumer's cable company, the television guide that consumer uses, the brand and model of the consumer's cable box (it is sometimes possible to deduce this data from the ZIP code or cable company name data) and the brand and model of the consumer's VCR. As with the initial setup of the custom programmer, the channel map and cable box IR codes can be determined from this data. If the VCR remote control is also a universal remote control, the representative inquires as to the brands and models of any other IR controllable home electronic equipment that the consumer may wish to control with the VCR remote control.

Once the channel map and IR code data to be downloaded have been identified in block 1442, the initial setup data, including the channel map, IR code data and the current time, including the date, is downloaded over the telephone line to the VCR remote control. In the preferred embodiment, the initial setup data is generated by a computer at or connected to the representative's location, transmitted over telephone lines, received by the VCR remote control's microphone or modular phone jack and decoder, and stored into RAM 1404 by CPU 1402.

In block 1448, the consumer presses a "send" key or a sequence of keys that triggers the transmission of the initial setup data through the IR transmitter to the VCR's IR receiver. If the VCR remote control is a universal remote, the IR codes for IR controllable devices other than the cable box are preferably not transmitted to the VCR as they are used by the VCR remote control itself, not the VCR. The data is stored by the VCR's CPU into the VCR's RAM.

In an alternative embodiment, the VCR remote control's IR transmitter is not a multi-directional or wide angle IR transmitter. The more expensive multi-directional or wide angle IR transmitters are not necessary because the IR transmitter is not used to transmit IR signals when the VCR remote control is set on a table or on top of the cable box or VCR.

In any case, in the preferred embodiment, a multi-directional or wide angle IR transmitter is retained to increase the likelihood of the successful downloading of all of the initial setup data. Although the quantity of the initial setup data is not tremendous, it is

substantial. Thus, an uninterrupted IR stream of a significant duration is required to reach the VCR from the VCR remote control. The more diverse the radiation of IR signals is, the more likely it is that all of a stream of IR signals will reach the IR receiver in the VCR, either directly or by reflection.

For preexisting VCRs with a built in instant programmer and IR transmitter that were made before the present VCR remote controller and that can also have their initial setup performed through the use of a remote control, the VCR remote controller can be programmed, either with a program stored in ROM at manufacture or by telephone into RAM, to use the preexisting VCRs own protocol for initial setup using a remote controller. In other words, the VCR remote control is programmed to mimic a consumer using the VCR's original remote controller to perform the initial setup.

In VCRs designed specifically for use with the VCR remote controller, a special protocol, designed to reduce the length of the IR transmission sent to the VCR is used. In an alternative embodiment, part of this special protocol includes using a receipt confirmation signal combined with known error detection and/or error correction schemes to assure the reception of the entire stream of initial setup data by the VCR. Known error detection schemes that can be used include using a parity check bit in every byte of data and embedding a code at some point in the data stream that indicates the length of the entire data stream. The use of these and other known error detection and correction schemes allows the VCR to verify whether the complete stream of error free initial setup data was received. If it is verified that the data received is correct and complete, the VCR can produce an indication, either audio or visual, that the initial setup data was successfully received. If it is not verified that the data received is correct and complete, the VCR either gives no indication or produces a second indication to indicate an unsuccessful transmission. Upon an unsuccessful transmission, the consumer adjusts the position of the VCR remote control relative to the VCR and retransmits the initial setup data.

Another alternative is to provide modular telephone jacks in both the VCR and the VCR remote control for downloading the initial setup data from the VCR remote control to the VCR. This embodiment provides for more error free transmission of the initial setup data, but forces the consumer to connect, disconnect and store the cable that links the VCR remote control and the VCR.

Yet another alternative is to include in the VCR a microphone and decoder assembly similar to the microphone and decoder assembly 1412-1414 in the VCR remote control. An encoder and speaker (not shown) are then added to the VCR remote control. With this alternative embodiment the initial setup data is transmitted from the VCR remote control to the VCR using the same type of audio signals as used to download the initial setup data over the telephone lines to the VCR remote control. When the consumer is ready to transmit the initial setup data from the VCR remote control to the VCR, he or she simply holds up the

speaker of the VCR remote control to the microphone of the VCR and presses the keys necessary to trigger transmission. In the preferred embodiment of this alternative, with current speaker and microphone technology, the speaker and microphone on the VCR remote control can be combined into a single microphone/speaker component.

In the downloading process of blocks 1446-1451 of FIG. 7, the channel map data and IR code data for the VCR is transmitted and stored into the RAM of the VCR remote control first. Thereafter the data is retransmitted to the VCR and stored into the RAM of the VCR. After transmission to the VCR of the channel map data and IR code data for the VCR is completed, the channel map and IR code data for the VCR is erased from the RAM in the VCR remote control. If IR code data for use by the VCR remote itself is initially downloaded with the channel map data and IR code data for the VCR, this data is, of course, not erased from the RAM in the VCR remote control.

The IR codes for control of the cable box and other remote controllable electronic equipment that are downloaded over a telephone line to the video recorder, either directly or via a VCR remote, are stored in different ways in different alternative embodiments. Thus, IR codes for numerous cable boxes and other devices can be stored in the ROMs of the video recorder and the VCR remote with the addresses of the IR codes for a particular cable box or other device being downloaded to the RAM of the video recorder or VCR remote. Alternatively, the IR codes themselves can be downloaded to the RAM of the video recorder or VCR remote.

The invention as shown in the various embodiments of the VCR remote 1400 can readily be used with televisions, cable boxes, satellite receivers or other components that contain remote control transmitters. The only differences in operation in these alternate configurations are the IR codes and downloading protocols that the VCR remote uses. However, the VCR remote as described above is capable of having these codes and protocols downloaded by telephone along with the initial setup data.

The initial setup data includes IR codes or IR code addresses for the remote control of other electronic equipment, local channel maps and the current time. In addition to initial setup data, data representing programs that are desired to be recorded or viewed may be downloaded to the various telephone downloadable programmers. The downloaded data representing a program to be recorded is in the form of the actual values of the channel, date, time-of-day and length of the program. Alternatively, the data downloaded representing a program to be recorded or viewed, is in the form of a compressed code or G-code, which contains the channel, date, time-of-day and length of the program.

The physical configuration of this embodiment for downloading program information is shown in FIG. 11. FIG. 12 shows a flow diagram of the process of selecting and downloading program information according to this embodiment. In block 1500, the user calls a customer service representative 1520 located at a remote site on the telephone, either

on a pay-per-minute or pay-per-call 900 number, toll-free 800 number or regular toll number. In block 1502, the user orally tells the representative either specific shows that the user wants to record or a more general description of a type of show to be recorded or viewed. Such general descriptions include the type of show, such as situation comedies, dramas, action shows, mysteries, police or detective shows, real life rescue, emergency or police shows, game shows, news magazines, daily news programs, documentaries, sports events, movies, etc. The general descriptions further include more specific descriptions such as movies or shows starring a particular actor or actress or directed by a certain director (e.g. "all Humphrey Bogart movies"), sporting events involving a particular team and/or a particular sport (e.g. "all U.C.L.A. basketball games"), a show that may be on multiple times a week on different channels (e.g., "all episodes of 'I Love Lucy' on this week").

In block 1504, the representative enters the information given by the user in block 1502 into a computer 1522. The computer includes a large database of television programs to be broadcast in the future, stored in mass storage 1526, such as a hard disk. The computer then searches the database for television programs that match the information entered by the representative and retrieves the channel, date, time-of-day and length data for each program matching the information entered. In block 1506, the computer automatically checks the date, time-of-day and length data for all the programs retrieved in the database search for time conflicts between programs that overlap each other.

If there is a time conflict, the computer alerts the representative that there is a time conflict and the programs that are involved. In block 1508, the representative informs the user of the time conflict and the programs that are conflicting. The user then decides which of the conflicting programs he or she wishes to record or view. Alternatively, the user chooses to have only the non-conflicting portion of a program that partially conflicts with another program recorded or viewed to avoid the conflict. For example, if two programs are selected that both begin at 8:00 pm on Sunday, but one lasts one hour and the other lasts two hours, the user can choose to record the one hour program and the second hour of the two hour program. The user tells the representative how to resolve the conflict and, in block 1510, the representative enters this information into the computer, which adjusts the selected programs accordingly, in block 1512.

In one embodiment, in block 1514, the computer converts the channel, date, time-of-day and length of each of the programs remaining after the search of the database and after resolving time conflicts, if any, into G-codes for use by downloadable programmers that perform the functions of the instant programmer. Such a programmer is representatively shown by dotted line 1524 with the programmer 1524 having a CPU 1526, a microphone and high pass filter 1528 (similar to programmer 1100 as shown in FIG 44), a random access memory (RAM) 1532, which includes a stack memory for storing the CDTL information, a ROM 1530, a remote control transmitter 1536 (which is usually an infrared emitter) and

a display 1531. In block 1516, the computer downloads the G-codes over a telephone line to a telephone downloadable programmer 1524 that performs the functions of the instant programmer.

In another embodiment, the blocks 1514 and 1516 are replaced by a block (not shown) in which the computer downloads data representing the channel, date, time-of-day and length of each of the programs selected by the search of the database and modified to resolve time conflicts, if any, over a telephone line to any telephone downloadable programmer, such as programmer 1524.

After program data is downloaded to a telephone downloadable programmer, and decoded into channel, date, time-of-day and length if G-codes were downloaded, the CDTL data is stored into the memory of any of the telephone downloadable programmers, such as stack memory of RAM 1532. After the program data is stored in memory, the control of the recording of the programs according to this data is performed in same manner as performed by the various telephone downloadable programmers described above.

In an alternative embodiment, the program data is downloaded to the telephone downloadable programmers for control of a television or cable box only, rather than for control of a video recorder. With this embodiment, the user is able to use a telephone downloadable programmer to simply change the channel of his or her television or cable box to assure that an important show is not missed because the user forgets what time it is or becomes engrossed in another show or simply because the user does not want to bother having to change channels manually.

The format of the database file to store the great amount of information about the future television broadcasts of television programs and the database program used to manipulate and search the database file can be any well known database format and corresponding database engine. In the preferred embodiment, the database format used consists of a series of records, each consisting of a predetermined set of fields that is the same as the set of fields in every other record in the database. Each television program corresponds to one record of the database. Each record contains fields for the title, channel, date, starting time-of-day and the length of the program. Further, each record includes a series of boolean fields, each field representing a certain category of television program, such as situation comedy, romantic movie, sports program, etc. The advantage of this embodiment is that many different categories may be easily represented and searched, while taking up little space. This embodiment takes up little space because even though there may be over a hundred different category fields, a boolean field usually takes up only one bit or at most one byte of space for each record in most database file formats. The small size of each category field also facilitates rapid searching through the database for all the programs in a certain category. This embodiment also allows for multiple overlapping categories. For example, the database may have separate category fields for crime subject matter, comedy,

and fiction. One television program may be a fictional comedy about crime, thus containing a "true" value in all three category fields. On the other hand, a program may be a real life drama about crime which only would contain a "true" value in one of these category fields, viz. the crime subject matter field.

In addition to the boolean category fields, each record includes several "people" fields. The contents of the "people" fields include characters in the program, actors and actresses, directors and writers involved with the creation of the program. Thus, if a user desires to program all programs involving certain people, be they characters, actors or creators of the program, the computer can search the "people" fields for this information. Alternatively, there can be separate fields for characters, actors and actresses, and creators of programs.

Each record also includes fields devoted to the violence and sexual content of the television program. In the case of motion pictures, a field for the rating by the Motion Picture Association is utilized. In every record, boolean fields for such descriptions as mild violence, explicit violence, brief nudity, nudity, profanity, adult situations, and sexual theme are included. Thus, programs can be selected or excluded from a search based on such general content information.

Each record of the database also includes an abstract that contains a brief description of the program. This allows a more detailed and extensive search, albeit more time consuming, of specific program content by searching all of the abstract fields for certain keywords or combinations of keywords.

In an alternative embodiment shown in FIG. 13, the functional elements of the instant programmer, custom programmer 1100, or remote controller 1400 are embedded within a telephone set 1550. In the embodiment shown in FIG. 13, no microphone 1140, as shown in FIG. 2, for downloading information from a telephone receiver is required, because the telephone set with the instant programmer is connected directly to the telephone network, as shown by telephone connection 1582. The telephone connection is to a telephone network, and the connection can be via telephone lines or via a cellular network. In the embodiment shown in FIG. 13, the telephone set comprises a telephone base unit 1554 into which a cordless telephone 1552 is inserted. The telephone base unit can hold the cordless telephone and also charge the batteries of the cordless telephone. A telephone set that does not include a cordless telephone is another embodiment that is not shown, but such a telephone set operates very similarly to the description that follows for the telephone base unit except there would not be a cordless telephone or an RF link to the cordless telephone.

The cordless telephone 1552 includes controls 1562 and controls 1564 which correspond to the controls 1302 and 1304 of the instant programmer of FIG. 53, or the controls on instant programmer 1100. The cordless telephone also includes a display 1566 corresponding to display 1134 of instant programmer 1100. An antenna 1570 is included on the cordless telephone to provide a RF link to the telephone base unit. An infrared

transparent cover 1568 covers an infrared transmitter and in one embodiment also an infrared receiver.

The telephone base unit 1554 includes controls 1578 and 1576 which correspond to the controls 1562 and 1564 on the cordless telephone. The telephone base unit also includes antenna 1574 for providing an RF link to the cordless telephone 1552. The telephone base unit can also contain a display 1572 corresponding to display 1566 on the cordless telephone. The telephone base unit can have a direct wall power connection 1580 and be connected directly to the telephone line via connection 1582. Alternatively, the connection to the telephone network can be via a cellular network. Various designs of the telephone base unit and the cordless telephone are possible. FIG. 13 shows one possible design in which the telephone base unit 1554 has a semicircular tower 1584 that is designed to hold the cordless telephone 1552. The tower 1584 also has the function of providing an elevated tower for holding infrared transmitters and an infrared receiver.

FIG. 14 shows the telephone base unit 1584 with the cordless telephone removed. Evident at the base of the tower are contacts 1586 which are used to supply power to charge the battery in the cordless telephone when the cordless telephone is plugged into the telephone base unit. Also shown in FIG. 14 are infrared transmitters 1588. The infrared transmitters can be located around the top of the tower pointing in an upward direction, a right direction, a left direction, a rear direction and a forward direction. The multiple infrared transmitters insure that the telephone base unit will communicate properly with the appliances to be controlled regardless of the orientation of the telephone unit with respect to those units. Also shown in FIG. 14 are infrared receivers 1589 which can be placed at the top of the tower 1584 for receiving information from the appliances.

In this application the term appliances includes televisions, cable boxes, satellite receivers, VCRs, stereos and other similar equipment, including any remote controller for the various apparatus. The term appliances also includes other apparatus such as heaters, thermostats, washing machines, ovens, lights, and computers.

FIG. 15 shows the cordless telephone 1552 removed from the telephone base unit 1554. In the base of the cordless telephone 1552, batteries 1592 are located. FIG. 15 shows an infrared transmitter 1590 and an infrared receiver 1591 located below the infrared transparent cover 1568. FIG. 16 is a bottom view of the cordless telephone, showing contacts 1596 which engage contacts 1586 on the telephone base unit 1554 when the cordless telephone 1552 is plugged into the telephone base unit 1554.

FIG. 17 shows the telephone base unit 1554 located on a table near a video cassette recorder 1602, a cable box 1604 and a television 1600. The cordless telephone 1552, which can be in the same room as the telephone base unit or be in a different room, communicates with the telephone base unit via RF signals 1606. The telephone base unit controls the VCR, cable box, and television set via infrared signals 1601. The cordless telephone, if it is in the

same room as the appliances, can also control the appliances via transmission signals 1603, which can be infrared signals, or RF signals if the appliances contain an RF receiver.

As described below, television signals can contain embedded information which can be extracted by the VCR and transmitted to the telephone base unit or to the cordless telephone via transmission signals 1605, which can be infrared signals, or RF signals if the appliances contain an RF transmitter.

FIG. 18 is a block diagram of the cordless telephone. The cordless telephone has a microcomputer 1610, which consists of a CPU, ROM, RAM, I/O ports, timers and counters, and a clock. The microcomputer is used to implement the decoding of compressed codes having at least one digit into channel, time-of-day and length commands. Programs stored in the memory of the microcomputer also are instrumental in implementing the other functions of the cordless telephone. The microcomputer has an input from an oscillator 1612 and inputs from the keypad 1616 on the cordless telephone. The microcomputer drives a LCD display 1614 and also drives a warning light-emitting diode 1624. Communications to the telephone base unit are via transmitter/receiver 1618 and antenna 1570. The cordless telephone can send commands to appliances through the infrared transmitter 1620 or the RF transmitter 1618 and can receive information from the appliances via infrared receiver 1622 or the RF receiver 1618. Battery 1592 provides power to the cordless telephone and can be charged from the telephone base unit.

FIG. 19 shows a block diagram of the telephone base unit 1554. The telephone base unit has a microcomputer 1630 which contains a CPU, ROM, RAM, I/O ports, timers and counters, and a clock. The microcomputer is used to implement the decoding of compressed codes having at least one digit into channel, time-of-day and length commands. Programs stored in the memory of the microcomputer also are instrumental in implementing the other functions of the telephone base unit. The microcomputer has input from an oscillator 1632 and from a keypad 1636 on the face of the telephone base unit. The microcomputer drives a LCD display 1634 on the telephone base unit and also drives a warning light-emitting diode 1644. Communication with the cordless telephone is via transmitter/receiver 1638 and antenna 1574. The telephone base unit can send commands to the appliances via five-way infrared transmitter 1640, which can transmit to the front, the back, left, right and up to insure communication with the appliances, or via RF transmitter 1638. Information from the appliances can be received by the telephone base unit via infrared receiver 1642 or via RF receiver 1638. The telephone base unit contains a converter 1643 for providing power from wall power to the telephone base unit and for charging the cordless telephone battery. The telephone base unit has a direct connection with telephone line 1646 via telephone circuit 1648 which communicates to a decoder 1650, which can be a DTMF decoder, for input to the microcomputer 1630. As discussed above, instead of connection to a telephone line the telephone base unit could be connected to the telephone network via a cellular network. The

microcomputer 1630 can communicate to the telephone circuit 1648 either directly or via voice generator 1652. The voice generator can synthesize speech for requesting a user to enter certain numbers, such as a password or a telephone number.

FIG. 20 is a block diagram of a system for controlling appliances via a telephone set. As shown in FIG. 20, the telephone base unit 1554 has an infrared (IR) transmitter 1640 and an antenna 1574. The cordless telephone 1552 has a RF antenna 1570 and an IR transmitter 1620. In FIG. 20, a cable box 1604 has an IR receiver 1676 and a satellite receiver 1670 has an infrared receiver 1678. The VCR 1602, which can receive signal inputs from the cable box, the satellite receiver, and/or an antenna, has an infrared receiver 1680. The TV 1600 has an infrared receiver 1682.

The telephone base unit and cordless telephone perform all of the functions of the instant programmer of U.S. Patent 5,335,079. The compressed code decoding is performed by the microcomputers in either the telephone base unit or the cordless telephone and, at the appropriate time, record-on commands are sent to the VCR 1602, and channel-select commands are sent to the cable box 1604, the satellite receiver 1670, and/or the VCR 1602. Then, when recording is complete according to the decoded length from the CDTL information for a program to be recorded, the VCR 1602 is commanded to stop recording. The warning light-emitting diode 1624 in the cordless telephone and the warning light-emitting diode 1644 in the telephone base unit have the same function as the warning light of the instant programmer.

The operation of the telephone base unit and the cordless telephone in controlling the recording of programs is the same as described for the instant programmer described in U.S. Patent 5,335,079.

Commands can also be sent to a television set based on decoded CDTL information, to turn on a television and switch to the correct channel at the appropriate time for a program, and then turn off the television when the program is over. This is especially useful for handicapped people.

FIG. 21 is a flow diagram of a method for downloading initial setup data to the telephone base unit via the telephone network. This method makes the initial setup of the instant programmer much easier. In step 1690, the user calls a representative at a remote site. Then in step 1692, the user identifies his zip code, the cable carrier, the television guide used by the user, and the model and brand of the VCR, cable box and any other appliances to be controlled, such as a satellite receiver. In step 1694, the representative enters this data into a computer, and then in step 1696, the computer downloads initial setup data to the telephone base unit. Then in step 1698, the telephone base unit via the RF antenna sends initial setup data to the cordless telephone. In step 1700, the telephone base unit sends the initial setup data to the VCR and any other appliance that requires initial setup data. The data sent to the VCR and other appliances depends on the data needed by the VCR

or the other appliances to operate with the telephone base unit. Then in step 1702, it is verified whether or not the data has been correctly received by the cordless phone and any other appliance. If not, then the data is sent again. If the data has been correctly received, then the initial setup of the telephone set and the cordless telephone and any appliance is complete, as shown in step 1704.

Another service that can be performed by a representative at a remote site is to generate a set of compressed codes corresponding to selection criteria specified by a user. FIG. 22 shows a flow diagram for performing this function. In step 1710, the user calls a representative at a remote site, and then in step 1712, the user identifies the TV program category, such as sports, children's programs or other selection criteria. In step 1714, the representative enters the selection criteria into a computer. The computer selects programs according to the selection criteria, and then in step 1716, it is determined whether there are conflicts between the selected programs. If there are, then the representative inquires from the user how the conflicts should be resolved in step 1718. In step 1720, the representative enters the conflict resolution into the computer, and then in step 1722, the computer adjusts the selected programs. In step 1724, the computer generates the compressed codes for the selected programs, and then in step 1726, the computer downloads compressed codes for the selected programs to the telephone base unit via the telephone network. Then in step 1728, the telephone base unit controls the recording of selected programs according to the downloaded data.

Another embodiment includes apparatus and a method for the user to call from a remote telephone to enter a compressed code into the telephone base unit via the telephone network. FIG. 23 is a flow diagram of the steps that the telephone base unit performs to allow a user to remotely enter a compressed code into the telephone base unit. In step 1730, the telephone is ringing. In step 1732, it is determined whether the phone has been answered by a person. If yes, then in step 1734, the method waits for the telephone to be put back on the hook and then the method recycles to step 1730. If the phone is not answered after N rings, the telephone base unit answers the telephone call. Then in step 1738, the telephone base unit asks the caller (via voice generation) to enter the telephone number that the user is calling from. If the caller enters a telephone number in step 1740, then in step 1742, the telephone number is stored for later review. On the other hand, if the caller enters a password in step 1744 and the password is correct as determined by steps 1746, 1748 and 1750, then in step 1754, the caller is asked to enter a compressed code. The purpose of storing telephone numbers that are entered by callers and requiring that a caller enter a password before being able to enter a compressed code is to provide security so that only an authorized caller can enter a compressed code into the telephone base unit. The stored telephone number can be used by the user to know who called. In step 1758, the telephone

base unit stores the compressed code that has been entered, and then in step 1760, the telephone base unit uses the compressed code to control recording of selected programs.

Another embodiment of the invention is to provide a method and apparatus for the telephone base unit to control the volume of audio apparatus, such as a television set, a video cassette recorder, a stereo set, etc. The telephone base unit can perform this function via the infrared transmitter or the RF transmitter built into the telephone base unit. FIG. 24 is a flow diagram of a method for performing this function. When the telephone rings in step 1770 and a user answers the telephone in step 1772, then the telephone base unit sends a command to the audio apparatus to lower the volume or entirely mute the audio as shown in step 1774. These commands are sent via the infrared or RF transmitter in the telephone base unit. When the telephone base unit determines that a call has been terminated in step 1776, then the telephone base unit sends a command to the audio apparatus to raise the volume to the previous level.

In another embodiment of the invention, information is embedded in the television signal received via cable, satellite receiver, or an antenna, and can be extracted from the television signal by an appliance, such as a VCR and transmitted to the telephone base unit. One method of embedding the information into the television signal is to embed the information in the vertical blanking intervals of a television signal.

FIG. 25 is a diagram illustrating the fields, frames and vertical blanking interval of an interlaced television scanning raster 1780. The first field 1782 of the television signal starts at the upper left corner of the screen and writes lines 21, 22, . . . 263. At the bottom of the screen, the beam writing the screen retraces in a series of lines back to the top of the screen. These lines are known as the vertical blanking interval lines 1786. During the retrace, the writing to the screen is blanked; however, because the signal is still present, additional information can be sent during the vertical blanking interval. There are at least 20 lines in a vertical blanking interval. After the vertical blanking interval, the second field 1784 is written on the screen in lines 283, 284, . . . 525 which are interleaved between the lines of the first field 1782. The two fields and the vertical blanking interval together constitute a frame.

FIG. 26 is a diagram illustrating the timing 1790 of the vertical blanking interval lines 1-21. As shown, each vertical blanking interval line 1792 occupies a portion of the time span. The vertical blanking interval can contain closed caption data 1791 for the hearing impaired and extended data services (EDS) data 1793.

Caption data decoding is further described in the following specifications, which are hereby incorporated by reference herein: Title 47, Code of Federal Regulations, Part 15 as amended by GEN. Docket No. 91-1; FCC 91-119; "CLOSED CAPTION DECODER REQUIREMENTS FOR THE TELEVISION RECEIVERS"; Title 47 C.F.R., Part 73.682(a)(22), Caption Transmission format; Title 47, C.F.R. Part 73.699, figure 6;

"TELEVISION SYNCHRONIZING WAVE FORM"; Title 47, C.F.R., Part 73.699, figure 17a; "LINE 21, FIELD 1 DATA SIGNAL FORMAT"; and PBS Engineering Report No. E-7709-C, "TELEVISION CAPTIONING FOR THE DEAF: SIGNAL AND DISPLAY SPECIFICATIONS."

The extended data services (EDS) is further described in the Recommended Practice for Line 21 Data Service, Electronics Industries Association, EIA-608 (drafts October 12, 1992 and June 17, 1993), the subject matter of which is incorporated herein by reference.

The vertical blanking interval can also contain, as illustrated by data 1794, a channel-specific program guide (CSPG), program-related information (PRI), instant information (IINFO), a video magazine (V(M)) packet, a TPA (tape identification, program number, absolute address) packet, and/or a directory of programs recorded on a tape. Each vertical blanking interval line can contain 2 to 4 bytes of information. So, to transfer an entire set of data, such as a directory, multiple fields and frames are required.

FIG. 27 shows a VCR 1800 capable of decoding information in the vertical blanking interval lines and transmitting that information to the base telephone unit. The VCR 1800 shown in FIG. 27 is very similar to the indexing VCR described in patent application Serial No. 08/176,852, filed December 30, 1993, which is incorporated herein by this reference as though set forth in full. As shown in FIG. 27, the VCR 1800 has a tuner 1802 which receives a television signal from either an antenna, a cable box 1604, or a satellite receiver 1670. A VBI decoder 1804 is coupled to the output of tuner 1802. A microcomputer 1810, which implements the VCR control logic, receives the output of VBI decoder 1804. The microcomputer 1810 can control character generator 1806 to provide an on-screen display of information decoder by VBI decoder 1804 on a television monitor by adding the character to the television signal in adder 1808. The VCR can also transmit the information decoded by the VBI decoder 1804 via the infrared transmitter 1814 to the telephone base unit. The transmitter 1814 can also be implemented as an RF transmitter. The VCR 1800 has memory for storing a directory of programs recorded on video cassette tape and is designed to allow a user to conveniently access a particular program recorded on a tape. This is done by using the TPA packets and a directory recorded on a tape as shown in FIG. 28.

FIG. 28 shows a portion of a tape 1820 onto which TPA packets have been written in VBI line 19, represented as element 1822, and in which the directory has been written into VBI line 20 of the tape, represented as element 1824. The TPA packets 1828 each contain a tape identification, a program number and an absolute address along the tape. The directory 1826, which is recorded along the tape, contains a directory of all of the programs on the tape. The user accesses a program by selecting one from the directory and then the indexing VCR 1800 can automatically access the beginning of the program by using the TPA packets recorded along the tape.

FIG. 29A shows a diagram of the format of a TPA packet recorded in the vertical blanking interval lines. The TPA packet contains a tape identification 1830, a program number 1832, and an absolute address 1834. FIG. 29B shows the information that can be contained in a directory in the VBI lines. The directory can contain a program title 1836, a program number 1838, a start address along the tape for the program 1840, and an address 1842, a record speed 1844, and additional fields 1846 which can contain, for example, a short description of the program. The method for using TPA packets and a directory for allowing a user to conveniently access a program along a tape is further described in patent application Serial No. 08/167,185, filed December 15, 1993, which is incorporated herein by this reference as though set forth in full.

In the embodiment shown in FIG. 27 for an indexing VCR 1800, any information in a television signal that is recorded in the vertical blanking interval lines can be sent to the telephone base unit via infrared transmitter 1814. For example, if a tape is being played on the VCR 1800 that has TPA packets and a directory stored along the tape, then information in the TPA packets or the directory can be sent via infrared transmitter 1814 to the telephone base unit and viewed on the display of the telephone base unit or on the display of the cordless telephone, which can receive the same information via an infrared receiver on the cordless telephone or from the telephone base unit via the RF communication link between the telephone base unit and the cordless telephone. As described above, the information could also be sent from the VCR via an RF transmitter.

In an embodiment of the invention, program-related information that is embedded in the vertical blanking interval lines of a television signal includes a telephone number related to information that is being broadcast, or that has been recorded on a tape that is being played on the VCR, such as an advertisement. The telephone number in the program-related information can be extracted from the television signal via VBI decoder 1804 and sent to the telephone base unit via infrared transmitter 1814. A method is provided for automatically dialing this number upon command of the user, as shown in FIG. 32. In step 1870 of FIG. 32, the program-related information is displayed on the television monitor by using character generator 1806. The program-related information is transmitted to the telephone base unit and/or the cordless telephone via the infrared transmitter 1814 and stored in the telephone base unit. Then in step 1874, the user can operate the cordless telephone or the telephone base unit to recall the program-related information containing the telephone number from storage in the telephone base unit and transmit the data for display on either the television monitor or on the display of the telephone base unit or the cordless telephone. The RF communication link between the cordless telephone and the telephone base unit makes the location of the storage of the program-related information in either the telephone base unit or the cordless telephone transparent to the user. Then in step 1876, if the displayed program-related information is a telephone number, then the user can push a button on the

cordless telephone or the telephone base unit to automatically dial the program-related information telephone number.

In an alternate embodiment, the program related information contains a telephone number and when sent to the telephone base unit, a little green light on the telephone base unit blinks, indicating the telephone has a telephone number, which can be dialed by pressing a single button. Via the communication link with the cordless telephone, a light on the cordless telephone also blinks and the user can press a single button on the cordless telephone to dial the telephone number.

FIG. 30 is a block diagram of a system using a telephone base unit 1554, a cordless telephone 1552, indexing VCR 1800, cable box 1604, satellite receiver 1670, and television 1600. In addition to the functions of the system of FIG. 20, the system of FIG. 30 includes a capability of the VCR 1800 decoding information embedded in the television signal in the vertical blanking interval lines via VBI decoder 1804 and transmitting that information to the telephone base unit 1554 or the cordless telephone 1552 via infrared transmitter 1814.

In another embodiment of the invention, the telephone base unit 1555 contains all the functions of the telephone base unit 1554 and in addition has a VBI decoder 1860, a character generator 1862, and a television signal adder 1864, as shown in FIG. 31. In the system shown in FIG. 31, the output of a conventional VCR 1602 is sent to the telephone base unit 1555, which can decode information embedded in a television signal with VBI decoder 1860, generate characters in character generator 1862, add the generated characters to the television signal in adder 1864, and send the composite television signal to television 1600 which can display the television signal on television monitor 1850. The key advantage of telephone base unit 1555 is that information can be decoded from the vertical blanking interval lines and stored and used by the telephone base unit 1555 without the need for an indexing VCR 1800, as shown in the system of FIG. 30. Thus, the increased cost of an indexing VCR 1800 is avoided for households that already own a more conventional VCR 1602.

The described embodiments of the invention are only considered to be preferred and illustrative of the inventive concept, the scope of the invention is not to be restricted to such embodiments. Various and numerous other arrangements may be devised by one skilled in the art without departing from the spirit and scope of this invention.

It is therefore intended by the appended claims to cover any and all such applications, modifications and embodiments within the scope of the present invention.